

EUCALYPTUS CADENS (MYRTACEAE), A NEW SWAMP GUM FROM THE WARBY RANGE, NORTH-EAST VICTORIA

by

J. D. BRIGGS¹ and M. D. CRISP²

ABSTRACT

Briggs, J. D. and Crisp, M. D. *Eucalyptus cadens* (Myrtaceae), a new swamp gum from the Warby Range, North-East Victoria. *Muelleria* 7 (1): 7–13 (1989). — A new eucalypt, known only from a single locality in the Warby Range in NE. Victoria, is described and named. It is related to the Swamp Gums (the informal *E.* subser. *Ovatinae*), particularly *E. aggregata* Deane & Maiden, but is readily distinguished by its glaucous new growth. Often mature trees lean or fall over but continue to thrive in their boggy habitat which surrounds permanent springs.

INTRODUCTION

The first record of this species appears to be a collection made in 1979 by Mr A. C. Beaglehole and Miss C. D. Nason on the late Miss Nason's property in the Warby Range. The same collectors obtained more material in 1985, and subsequently the population was listed by Beaglehole (1986) under the name *E. yarraensis* Maiden & Cabbage. Miss Nason had also mentioned the existence of this unusual eucalypt to Mr J. L. Briggs, a local beekeeper, who recently visited the site and sent specimens to one of us (J. D. Briggs, his nephew) for identification. As the specimens did not match any species known to us, we undertook further investigations including field studies, collection of additional specimens and the growing of seedlings. The distinctiveness of the population combined with a lack of segregation in the seedlings convinced us that this was a new species. In this paper, we describe and name the new eucalypt and discuss its affinities and conservation status.

TAXONOMY

Eucalyptus cadens J. Briggs & Crisp, sp. nov.

E. aggregata Deane & Maiden arte simulans sed surculis manifeste glaucis, foliis maturis glaucescentibus, cortice pro parte maxima laevi praeter in parte inferna trunci differt.

HOLOTYPE: Victoria, eastern foot of the Warby Range, between Wangaratta and Glenrowan, J. D. Briggs 2068 & J. L. Briggs, 8.x.1986, 2 sheets (CANB 370885-6).
ISOTYPE: CBG, HO, MEL, NSW.

Spreading *tree*, often leaning, or fallen and continuing to grow from existing shoots as well as producing new vertical stems from the old trunk; standing trees 8–25 m tall, to 1 m d.b.h.; forming a lignotuber; bark smooth, decorticating in short ribbons, greenish grey above a 1–10 m hard, dark-grey, finely furrowed stocking; oil glands abundant in bark; new shoots and leaves glaucous, weathering to grey-green at maturity; crowns frequently containing mostly intermediate leaves. *Cotyledons* bilobed. *Seedling leaves* decussate to 5th–7th node, subsessile, spreading, elliptic to oblong, mostly narrow, slightly concave above, obtuse or rounded at apex, abruptly tapered at base, 10–50 × 3–22 mm, grey-green; *juvenile leaves* (above 12th node) similar but not opposite, ascending, narrow-elliptic to linear, ± acute, more tapered at base, glaucescent; seedling stems terete, red. *Intermediate leaves* petiolate (1–5 mm), narrow-elliptic to elliptic, ± flat, acute or obtuse, to 200 × 65 mm, conspicuously glandular; late intermediate leaves narrow-ovate to elliptic, to 150 × 34 mm including petiole to 20 mm. *Adult leaves* mostly pendulous, narrow-elliptic, slightly falcate, tapering to both ends (often abruptly to apex), 70–115 × 9–20 mm including 5–14 mm

¹ CSIRO, Division of Plant Industry, P.O. Box 1600, Canberra, A.C.T., Australia 2601.

² Australian National Botanic Gardens, P.O. Box 1777, Canberra, A.C.T., Australia 2601.

petiole, with abundant oil glands; midrib prominent, venation obscure, intramarginal vein *c.* 0.75 mm from leaf margin. *Unit inflorescences* one per axil, 7-flowered; peduncles terete to slightly angular, 4–6 mm long, *c.* 1 mm thick. *Buds* broad-fusiform, up to 8 × 3 mm including 0.5–2 mm pedicel; *hypanthium* obconical, *c.* 3 × 3 mm, slightly contracted at base; *inner operculum* conical, slightly beaked, about equal in length and fractionally narrower than hypanthium; *outer operculum* shed early and intact, leaving scar. *Stamens*: filaments inflexed in bud, white; anthers versatile, obovoid, opening in vertical slits, *c.* 0.6 mm long. *Ovary* with 3 or 4 locules; ovules in 4 longitudinal rows on lower part of placenta; style clavate, 2.5–3 mm long; stigma blunt with a lobed surface, papillae short. *Fruit* densely clustered and appearing sessile, very broadly obconical, slightly contracted at base, 3.5–4.5 × 4.6–6 mm; pedicel 0–1.5 mm long; disc slightly raised, narrow (*c.* 0.5 mm wide); valves opening widely, exerted, 0.5–1 mm, rarely level with rim. *Seed* irregularly ellipsoid, depressed, smooth-edged, 1.0–1.7 mm long, 0.6–1.0 mm broad, *c.* 0.3 mm thick, shallowly reticulate, dullish-black, hilum ventral. (Figs 1–2).

FLOWERING PERIOD:

Late March to early May.

ETYMOLOGY:

The specific epithetic is from the Latin verb *cadere*, to fall down, and refers to the tendency of mature trees to lean or fall over in their boggy habitat.

DISTRIBUTION:

Known only from a single locality in the Warby Range of North-East Victoria where two stands, one of about 550 trees and the other of 45 trees, survive on 5 hectares of private property around the margins of two permanent springs.

OTHER SPECIMENS EXAMINED:

Victoria — Eastern foot of the Warby Range about 6 km N. of Glenrowan, 9.xi.1985, *A.C. Beauglehole 81544* & *C.D. Nason* (MEL); iv.1986, *J.L. Briggs 1, 2, 3* & *C.D. Nason* (CANB, CBG, MEL); 8.x.1986, *J.D. Briggs 2065* & *J.L. Briggs* (CANB, CBG, MEL, NSW); 8.x.1986, *J.D. Briggs 2069* & *J.L. Briggs* (AD, CANB, CBG, HO, MEL, MELU, NSW); 8.x.1986, *J.D. Briggs 2070* & *J.L. Briggs* (CANB, CBG); 30.xiii.1986, *J.D. Briggs 2166* & *J.L. Briggs* (AD, CANB, CBG, HO, MEL, MELU, NSW); 30.xii.1986, *J.D. Briggs 2168* & *J.L. Briggs* (CANB, CBG, HO, MEL, NSW); *J. Chappill 493, 494, 495*, and seedlings grown from these (MELU).

HABITAT:

The population of *E. cadens* is at the eastern foot of a steep hill on the very gently sloping floor of an open valley. There, it grows in seasonally waterlogged and permanently moist conditions in an area surrounding perennial springs. The soil is a grey sandy-clay loam overlying white gravelly clay. *Eucalyptus cadens* forms an almost pure stand in an open-forest/woodland community, where over half of the trees either have a significant lean or have fallen completely but continue to grow. A few specimens of *E. blakelyi* Maiden are scattered through the stand and about 5 trees of a form of *E. camphora* R. Baker occur in one edge of the larger stand. The understorey is predominantly a dense sedge and grass sward dominated by *Carex appressa* R. Br. and *Juncus* sp. (probably *J. sarophorus* L. Johnson), but with scattered shrubs of *Acacia melanoxylon* R. Br., *Leptospermum juniperinum* Smith and *Viminaria juncea* (Schrad & Wendl.) Hoffsgg. also present.

The slopes surrounding the site support *E. blakelyi* – *E. bridgesiana* R. Baker – *E. polyanthemus* Schauer – *E. albens* Benth. – *E. macrorhyncha* F. Muell. – *E. melliodora* Cunn. ex Schauer woodland and the adjacent flat areas have been heavily cleared and converted to pasture.

CONSERVATION STATUS:

Endangered, coded 2E (criteria from Leigh *et al.* 1981). *Eucalyptus cadens* is known only from the one locality where about 600 trees occupy a total area of about 5 ha on two private properties. The area is subject to cattle grazing which largely



Fig. 1. *Eucalyptus cadens*. a — branchlet. b — cotyledons. c — bud. d — tangential longitudinal section of bud, showing inflexion of stamens. e — anther, anterior view. f — anther, posterior view. g — post-flowering hypanthium and style. h — unit infructescence. a, h from J. D. Briggs 2068 (the type); c-g from J. L. Briggs 2; b from a living seedling, grown from J. L. Briggs 2.

prevents seedling regeneration. The stand occupies potential agricultural land and surrounds valuable permanent water supplies. There is a serious risk that much or all of the species could be cleared when the properties come under new ownership. The need for special protection of the species has become urgent in view of the recent death of Miss Nason who had been keen to preserve the large portion of the population which is on her land and whose family had owned the property since last century.



Fig 2. *Eucalyptus cadens*. a — seedling, ex J. L. Briggs 2, showing gradation from elliptic seedling leaves to the distinctly narrower juvenile leaves. b — typical habitat with a few standing trees and the bushy crowns of several fallen specimens evident. c — a fallen tree continuing to thrive in its boggy habitat. The paler glaucous new growth is a distinctive feature of this species. d — rough persistent bark forming a stocking to 10 m at the base of the trunks. e — branches showing the smooth bark which decorticates in ribbons.

No similar springs supporting stands of *E. cadens* were known to Miss Nason or other long-term residents of the area. Whilst a few scattered individuals of *E. cadens* may survive on private property along the edge of the Warby Range, substantial stands are unlikely to be found in view of the very limited potential habitat and the extent to which clearing has already occurred in the area.

AFFINITY:

Eucalyptus cadens clearly belongs to the informal *E. sect. Maidenaria* (Pryor & Johnson 1971). The strongest supporting evidence is the presence of oil glands in the bark, a feature which has been found to be largely confined to species in *E. sect. Maidenaria* (Crisp 1988 and references therein). Additional support for this placement comes from the bilobed cotyledons, more or less sessile juvenile leaves (Boland *et al.* 1984) and general appearance of the species.

Within *E. sect. Maidenaria*, placement in the informal *E. ser. Ovatae* (Pryor & Johnson 1971) is suggested by the subsessile seedling leaves, as opposed to the strictly sessile seedling leaves of *E. ser. Viminales*. Moreover, *E. cadens* bears a close resemblance to the Swamp Gums (informal *E. subser. Ovatinae* Pryor & Johnson 1971), particularly with respect to the obconical fruit and swampy habitat.

Despite its close resemblance to the Swamp Gums, *E. cadens* is immediately distinguished by its glaucous new growth, which weathers to a grey-green colour at maturity. Under a dissecting microscope, the leaf cuticle has a dull appearance. None of the Swamp Gums develop glaucescence, and under the microscope their cuticle often appears somewhat lustrous. Nevertheless, there is little doubt that *E. cadens* is closely related to this group, and Table 1 presents some comparisons.

Eucalyptus cadens resembles *E. aggregata* more closely than any other species. At all developmental stages except very young seedlings, both these species, together with *E. rodwayi*, have narrower leaves than the other Swamp Gums (Table 1). They are particularly close in bud and fruit morphology. Interestingly, the isolated Victorian population of *E. aggregata* (at Woodend) shows the closest similarity to *E. cadens*, particularly in bud and fruit shape. Despite this similarity, *E. aggregata* may be readily distinguished from *E. cadens* by its shiny green leaves, persistence of rough bark to the small branches and more gradually tapered adult leaves.

Most authors (e.g. Johnson 1962; Pryor and Johnson 1979; Simmons 1985) regard *Eucalyptus rodwayi* R. Baker and H. G. Smith, a Tasmanian endemic, as being closely related to *E. aggregata*. It is distinguished from *E. cadens* using similar character differences to those exhibited by *E. aggregata*.

It has been suggested to us (J. Chappill, pers. comm.) that *E. cadens* may be closely related to *E. camphora* R. Baker, especially to the type population near Rylstone, New South Wales. In a current, uncompleted study, R. Coorey (pers. comm.) has recognised four taxa within *E. camphora*. Two of these are represented in Table 1: the type population, and the most southern form, which is the only form occurring in Victoria. A few trees of the latter are growing at one end of the *E. cadens* population. All four forms of *E. camphora* appear to be united as a natural group by the presence of emarginate intermediate leaves. Neither *E. cadens* nor any other Swamp Gum species shows this character (Table 1). All forms of *E. camphora* have, on average, longer pedicels than *E. cadens* (examples in Table 1). The Victorian form of *E. camphora* differs further from *E. cadens* by its very broad somewhat lustrous leaves. In the type population of *E. camphora*, the leaves are much narrower; nevertheless, they are broader than and differently shaped from those of *E. cadens*, especially at the intermediate stage (Table 1). We have examined Chappill's adult and seedling specimens (Chappill 493-5) and all except one segregate seedling (out of eighteen seen) fall within our circumscription of the species. In particular, the late juvenile leaves were typically narrow and there was no evidence of the broad, emarginate intermediate leaves that characterise *E. camphora*.

Beaglehole (1986) identified the population of *E. cadens* as '*E. yarraensis*'. However, the latter species does not appear to be so closely related. It differs in having rough bark persistent to the small branches, glossy green leaves which are considerably

Table 1. Comparison of *Eucalyptus cadens* with some other swamp gums

Characters	<i>E. cadens</i>	<i>E. aggregata</i>	States in Taxa <i>E. camphora</i> ¹	<i>E. camphora</i> ²	<i>E. yarraensis</i>
	Bark	Smooth with up to 10 m of rough stocking	Rough to small branches	Smooth, sometimes with a short rough stocking	Smooth, sometimes with a short rough stocking
Glaucousness	Present on new growth	Absent	Absent	Absent	Absent
Juvenile leaf shape (above 12th node)	Narrow-elliptic to linear	Narrow-elliptic to linear	Elliptic, rarely narrow	Elliptic or ovate	Elliptic, oblong or ovate
Intermediate leaf shape	Narrow-elliptic to elliptic	Narrow-elliptic to elliptic	Elliptic or obovate	Broad-elliptic to orbicular	Broad-elliptic
Intermediate leaves emarginate (at least some)	-	-	+	+	-
Adult leaf shape	Narrow-elliptic	Narrow-elliptic or -ovate	Narrow-ovate	Elliptic or ovate	Narrow-elliptic or -ovate
Adult leaf apex	Abruptly tapered	Gradually tapered	Abruptly tapered	Abruptly tapered	Abruptly tapered
Adult leaf gloss	-	+	+	+	+
Hypanthium shape	Obconical	Obconical to hemispherical	Obconical	Obconical	Hemispherical to obconical
Pedicle length	0-1.5 mm	0.5-2 mm	1.5-3 mm	1.5-5 mm	0.5-3.5 mm

¹ Typical population, near Rylstone, New South Wales.² Southern New South Wales/Victorian form.

broader at the intermediate stages, a more or less hemispherical hypanthium, and usually longer pedicels (Table 1).

There is a history of confusion between the Swamp Gums and the closely related *E. aromaphloia* Pryor & J. H. Willis (Simmons & Brown 1986). Recently, Chappill *et al.* (1986) have demonstrated that *E. aromaphloia*, as previously circumscribed, comprises four distinct taxa. However, the entire *E. aromaphloia* complex may be readily distinguished from *E. cadens* by its rough bark which extends to the small branches, manifestly attenuate adult leaf and hemispherical fruit with a strongly raised disc.

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